WHAT IS CLAIMED IS:

1. An article which comprises:

a nanoporous metal membrane; and

a plating layer comprising at least one metal constituent formed on at least a portion of said nanoporous metal membrane.

2. The article according to claim 1, wherein said plating layer has a thickness of about 1 nm to about 5 nm.

3. The article according to claim 1, wherein said nanoporous metal membrane comprises gold.

4. The article according to claim 1, wherein said plating layer comprises at least one precious metal.

5. The article according to claim 1, wherein said plating layer comprises platinum.

6. The article according to claim 1, wherein said plating layer comprises at least one member selected from the group consisting of platinum, iridium, rhodium, ruthenium, palladium, cobalt and silver.

7. The article according to claim 1, wherein said plating layer comprises at least two metals.

8. The article according to claim 1, wherein said plating layer has a loading density of less than about 0.1 mg/cm^2.

9. The article according to claim 1, wherein said plating layer has a loading density of less than about 0.05 mg/cm^2.

10. The article according to claim 1, wherein said plating layer has a loading density of less than about 0.025 mg/cm^2.

11. The article according to claim 1, wherein said plating layer has a loading density of about 0.005 mg/cm^2.

12. The article according to claim 1, wherein said nanoporous metal membrane has a thickness of about 100 nm.

13. The article according to claim 1, wherein said nanoporous metal membrane has a thickness of less than about 500 nm.

14. The article according to claim 1, wherein said nanoporous metal membrane has a thickness of less than about 250 nm.

15. The article according to claim 1, wherein said nanoporous metal membrane has a thickness of less than about 100 nm.

16. A membrane electrode assembly which comprises:

a polymer electrolyte membrane; and

a nanoporous metal membrane adhered to at least one surface of said polymer electrolyte membrane, wherein said nanoporous metal membrane comprises a plating layer comprising at least one metal formed on at least a portion thereof.

17. The membrane electrode assembly according to claim 16, wherein said polymer electrolyte membrane comprises a member selected from the group consisting of perfluorinated sulphonic acids and polystyrene sulfonate.

18. The membrane electrode assembly according to claim 16, wherein said nanoporous metal membrane comprises gold.

19. The membrane electrode assembly according to claim 16, wherein said plating layer comprises at least one precious metal.

20. The membrane electrode assembly according to claim 16, wherein said plating layer comprises platinum.

21. The membrane electrode assembly according to claim 16, wherein said plating layer comprises at least one member selected from the group consisting of platinum, iridium, rhodium, ruthenium, palladium, cobalt and silver.

22. The membrane electrode assembly according to claim 16, wherein said plating layer has a thickness of about 1 nm to about 5 nm.

23. The membrane electrode assembly according to claim 16, wherein said plating layer has a loading density of less than about 0.1 mg/cm^2.

24. The membrane electrode assembly according to claim 16, wherein said plating layer has a loading density of less than about 0.05 mg/cm^2.

25. The membrane electrode assembly according to claim 16, wherein said plating layer has a loading density of less than about 0.025 mg/cm^2.

26. The membrane electrode assembly according to claim 16, wherein said plating layer has a loading density of about 0.005 mg/cm^2.

27. The membrane electrode assembly according to claim 16, wherein said nanoporous metal membrane has a thickness of about 100 nm.

28. The membrane electrode assembly according to claim 16, wherein said nanoporous metal membrane has a thickness less about 500 nm.

29. The membrane electrode assembly according to claim 16, wherein said nanoporous metal membrane has a thickness of less than about 250 nm.

30. The membrane electrode assembly according to claim 16, wherein said nanoporous metal membrane has a thickness of less than about 100 nm.

31. A fuel cell which comprises a membrane electrode assembly, wherein said membrane electrode assembly comprises a polymer electrolyte membrane; and a nanoporous metal membrane adhered to at least one surface of said polymer electrolyte membrane, and further wherein said nanoporous metal membrane comprises a plating layer comprising at least one metal formed on at least a portion thereof.

32. The fuel cell according to claim 31, wherein said polymer electrolyte membrane comprises a member selected from the group consisting of perfluorinated sulphonic acids and polystyrene sulfonate.

33. The fuel cell according to claim 31, wherein said nanoporous metal membrane comprises gold.

34. The fuel cell according to claim 31, wherein said plating layer comprises at least one precious metal.

35. The fuel cell according to claim 31, wherein said plating layer comprises platinum.

36. The fuel cell according to claim 31, wherein said plating layer comprises at least one member selected from the group consisting of platinum, iridium, rhodium, ruthenium, palladium, cobalt and silver.

37. The fuel cell according to claim 31, wherein said plating layer has a loading density of less than about 0.1 mg/cm^2.

38. The fuel cell according to claim 31, wherein said plating layer has a loading density of less than about 0.05 mg/cm^2.

39. The fuel cell according to claim 31, wherein said plating layer has a loading density of less than about 0.025 mg/cm^2.

40. The fuel cell according to claim 31, wherein said plating layer has a loading density of about 0.005 mg/cm^2.

41. A method which comprises:

freely supporting at least a portion of a nanoporous metal membrane on a metal plating solution comprising at least one plating metal; and

contacting said metal plating solution with a reducing agent, thereby plating at least a portion of said nanoporous metal membrane with said at least one plating metal.

42. The method according to claim 41, wherein said reducing agent is hydrazine.

43. The method according to claim 41, wherein said at least one plating metal is selected from the group consisting of platinum, iridium, rhodium, ruthenium, palladium, cobalt, silver and combinations thereof.

44. The method according to claim 41, wherein said metal plating solution comprises $Na_2Pt(OH)_6$.

45. The method according to claim 44, wherein said metal plating solution comprises about 2 g/l to about 20 g/l of $Na_2Pt(OH)_6$.

46. The method according to claim 41, wherein said nanoporous metal membrane comprises gold.

47. The method according to claim 41, wherein said metal plating solution is contacted with a vapor phase reducing agent.

48. The method according to claim 41, wherein said metal plating solution comprises at least two plating metals.

49. The method according to claim 41, wherein said method further comprises contacting a portion of said nanoporous metal membrane with at least one thiol prior to freely supporting at least a portion of said nanoporous metal membrane on a metal plating solution.

50. The method according to claim 49, wherein said thiol is $CH_3(CH_2)_{11}$-SH or $CH_3(CH_2)_{18}$-SH or combinations thereof.

51. The method according to claim 41, wherein the surface of said nanoporous metal membrane is plated with said at least one plating metal substantially continuously.

52. The method according to claim 41, wherein said nanoporous membrane is entirely freely supported on said metal plating solution.

53. A method which comprises:

contacting a nanoporous metal membrane with a metal plating solution comprising at least one plating metal; and

contacting said metal plating solution with a vapor phase reducing agent, thereby plating at least a portion of said nanoporous metal membrane with said at least one plating metal.

54. The method according to claim 53, wherein said reducing agent is hydrazine.

55. The method according to claim 53, wherein said at least one plating metal is selected from the group consisting of platinum, iridium, rhodium, ruthenium, palladium, cobalt, silver and combinations thereof.

56. The method according to claim 53, wherein said metal plating solution comprises $Na_2Pt(OH)_6$.

57. The method according to claim 56, wherein said metal plating solution comprises about 2 g/l to about 20 g/l of $Na_2Pt(OH)_6$.

58. The method according to claim 53, wherein said nanoporous metal membrane comprises gold.

59. The method according to claim 53, wherein the surface of said nanoporous metal membrane is plated with said at least one plating metal substantially continuously.

60. The method according to claim 53, wherein said metal plating solution comprises at least two plating metals.

61. The method according to claim 53, wherein said method further comprises contacting a portion of said nanoporous metal membrane with at least one thiol prior to contacting said nanoporous metal membrane with a metal plating solution.

62. The method according to claim 61, wherein said thiol is $CH_3(CH_2)_{11}$-SH, $CH_3(CH_2)_{18}$-SH or combinations thereof.

63. The method according to claim 53, wherein at least a portion of said nanoporous metal membrane is freely supported on said metal plating solution.

64. The method according to claim 53, wherein said nanoporous membrane is entirely freely supported on said metal plating solution.